

Claims

1. A process for producing a diene-based rubber-inorganic compound composite comprising a diene-based rubber and an inorganic compound represented by the following general formula (I), comprising a step of mixing an inorganic compound and/or a material capable of forming said inorganic compound, an anionic compound and a dispersion liquid of a diene-based rubber:



wherein M is at least one metal element selected from the group consisting of Al, Mg, Ti and Ca, metal oxide thereof or metal hydroxide thereof, and w, x, y, and z are an integer of from 1 to 5, an integer of from 0 to 10, an integer of from 2 to 5, and an integer of from 0 to 10, respectively.

2. The process for producing a diene-based rubber-inorganic compound composite according to Claim 1, wherein said material capable forming said inorganic compound is at least one material selected from the group consisting of metal salts, oxoacid salts of metals and organic metal compounds.

3. The process for producing a diene-based rubber-inorganic compound composite according to Claim 1, wherein said anionic compound is a compound having a carboxyl group.

4. The process for producing a diene-based rubber-inorganic compound composite according to Claim 3, wherein said compound having a carboxyl group is at least one compound selected from the group consisting of a rosinate and a salt of a fatty acid.

5. The process for producing a diene-based rubber-inorganic compound composite according to Claim 1, wherein said dispersion liquid of said diene-based rubber is a diene-based rubber latex synthesized by emulsion polymerization.

6. The process for producing a diene-based rubber-inorganic compound composite according to Claim 1, comprising a step of co-coagulating said diene-based rubber and said inorganic compound from said liquid mixture obtained in said mixing step by using an electrolyte comprising a metal salt, a step of separating a

coagulation product by filtration, and a step of drying said coagulation product.

7. The process for producing a diene-based rubber-inorganic compound composite according to Claim 1, wherein said diene-based rubber is a diene-based rubber having a polar group.

8. The process for producing a diene-based rubber-inorganic compound composite according to Claim 7, wherein said polar group is at least one kind of group selected from the group consisting of hydroxyl group, oxy group, alkoxysilyl group, epoxy group, carboxyl group, carbonyl group, oxycarbonyl group, sulfide group, disulfide group, sulfonyl group, sulfinyl group, thiocarbonyl group, imino group, amino group, nitrile group, ammonium group, imide group, amide group, hydrazo group, azo group and diazo group.

9. The process for producing a diene-based rubber-inorganic compound composite according to Claim 1, wherein said inorganic compound represented by the general formula (I) is an inorganic compound represented by the following general formula (II):



wherein m is an integer from 0 to 4 and n is an integer from 0 to 4.

10. The process for producing a diene-based rubber-inorganic compound composite according to Claim 2, wherein said metal constituting said metal salt, said oxo acid salt of metal and said organic metal compound is aluminium.

11. The process for producing a diene-based rubber-inorganic compound composite according to Claim 1, further comprising a step of mixing a dispersion liquid of a diene-based rubber to said liquid mixture obtained in said mixing step.

12. A diene-based rubber-inorganic compound composite which is obtained by the process according to Claim 1.

13. A process for producing a diene-based rubber-inorganic compound composite comprising a diene-based rubber and aluminium hydroxide, comprising:

a step of preparing an aluminium-containing suspension whose pH is controlled in a range between 5.1 and 8.4, and

a step of mixing said aluminium-containing suspension and a dispersion liquid of a diene-based rubber to co-coagulate said diene-based rubber and aluminium hydroxide, successively.

14. The process for producing a diene-based rubber-inorganic compound composite according to Claim 13, comprising a step of adding at least one kind selected from the group consisting an acid and a coagulation accelerator to said co-coagulated liquid mixture to complete the co-coagulation.

15. The process for producing a diene-based rubber-inorganic compound composite according to Claim 13, wherein said aluminium-containing suspension is prepared by using an aluminium salt containing an aluminate.

16. The process for producing a diene-based rubber-inorganic compound composite according to Claim 13, wherein said dispersion liquid of the diene-based rubber is a diene-based rubber latex by emulsion polymerization.

17. The process for producing a diene-based rubber-inorganic compound composite according to Claim 13, further comprising a step of separating a coagulation product by filtration and a step of drying said coagulation product.

18. The process for producing a diene-based rubber-inorganic compound composite according to Claim 13, wherein said diene-based rubber is a diene-based rubber having a polar group.

19. The process for producing a diene-based rubber-inorganic compound composite according to Claim 18, wherein said polar group is at least one kind of group selected from the group consisting of hydroxyl group, oxy group, alkoxysilyl group, epoxy group, carboxyl group, carbonyl group, oxycarbonyl group, sulfide group, disulfide group, sulfonyl group, sulfinyl group, thiocarbonyl group, imino group, amino group, nitrile group, ammonium group, imide group, amide group, hydrazo group, azo group and diazo group.

20. A diene-based rubber-inorganic compound composite which is obtained by the process according to Claim 13.